FRUITS OF PHILOSOPHY.

An Essay

ON THE

POPULATION QUESTION.

By CHARLES KNOWLTON, M.D.,

"Author of Modern Materialism."

SECOND NEW EDITION WITH NOTES.

SIXTIETH THOUSAND.

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PUBLISHERS' PREFACE.

THE pamphlet which we now present to the public is one which has been lately prosecuted under Lord Campbell's Act, and which we republish in order to test the right of publication. It was originally written by Charles Knowlton, M.D., an American physician, whose degree entitles him to be heard with respect on a medical question. It is openly sold and widely circulated in America at the present time. It was first published in England, about forty years ago, by James Watson, the gallant Radical, who came to London and took up Richard Carlile's work when Carlile was in jail. He sold it unchallenged for many years, approved it, and recommended it. It was printed and published by Messrs. Holyoake and Co., and found its place, with other works of a similar character, in their "Freethought Directory" of 1853, and was thus identified with Freethought literature at the then leading Freethought *depôt*. Mr. Austin Holyoake, working in conjunction with Mr. Bradlaugh at the *National Reformer* office, Johnson's Court, printed and published it in his turn, and this well-known Freethought advocate, in his "Large or Small Families," selected this pamphlet, together with R. D. Owen's "Moral Physiology" and the "Elements of Social Science," for special recommendation. Mr. Charles Watts, succeeding to Mr. Austin Holyoake's business, continued the sale, and when Mr. Watson died in 1875, he bought the plates of the work (with others) from Mrs.

Watson, and continued to advertise and to sell it until December 23, 1876. For the last forty years the book has thus been identified with Freethought, advertised by leading Freethinkers, published under the sanction of their names, and sold in the head-quarters of Freethought literature. If during this long period the party has thus—without one word of protest—circulated an indecent work, the less we talk about Freethought morality the better; the work has been largely sold, and if leading Freethinkers have sold it—profiting by the sale—in mere carelessness, few words could be strong enough to brand the indifference which thus scattered obscenity broadcast over the land. The pamphlet has been withdraw from circulation in consequence of the prosecution instituted against Mr. Charles Watts, but the question of its legality or illegality has not been tried; a plea of "Guilty" was put in by the publisher, and the book, therefore, was not examined, nor was any judgment passed upon it; no jury registered a verdict, and the judge stated that he had not read the work.

We republish this pamphlet, honestly believing that on all questions affecting the happiness of the people whether they be theological, political, or social, fullest right of free discussion ought to be maintained at all hazards. We do not personally endorse all that Dr. Knowlton says: his "Philosophical Proem" seems to us full of philosophical mistakes, and—as we are neither of us doctors—we are not prepared to endorse his medical views; but since progress can only be made through discussion, and no discussion is possible where differing opinions are suppressed, we claim the right to publish all opinions, so that the public, enabled to see all sides of a question, may have the materials for forming a sound judgment.

The alterations made are very slight; the book was badly printed, and errors of spelling and a few clumsy grammatical expressions have been corrected: the sub-title has been changed, and in one case four lines have been omitted, because they are repeated word for word further on. We have, however, made some additions to the pamphlet, which are in all cases kept distinct from the original text. Physiology has made great strides during the past forty years, and not considering it right to circulate erroneous physiology, we submitted the pamphlet to a doctor in whose accurate knowledge we have the fullest confidence, and who is widely known in all parts of the world as the author of the "Elements of Social Science;" the notes signed "G. R." are written by this gentleman. References to other works are given in foot-notes for the assistance of the reader, if he desires to study the subject further.

Old Radicals will remember that Richard Carlile published a work entitled "Every Woman's Book," which deals with the same subject, and advocates the same object, as Dr. Knowlton's pamphlet. R. D. Owen objected to the "style and tone" of Carlile's "Every Woman's Book" as not being "in good taste," and he wrote his "Moral Physiology," to do in America what Carlile's work was intended to do in England. This work of Carlile's was stigmatised as "indecent" and "immoral," because it advocated, as doe. Dr. Knowlton's, the use of preventive checks to population. In striving to carry on Carlile's work, we cannot expect to escape Carlile's reproach, but whether applauded or condemned we mean to carry it on, socially as well as politically and theologically.

We believe, with the Rev. Mr. Malthus, that population has a tendency to increase faster than the means of ex-

istence, and that *some* checks must therefore exercise control over population; the checks now exercised are semi-starvation and preventible disease; the enormous mortality among the infants of the poor is one of the checks which now keeps down the population. The checks that ought to control population are scientific, and it is these which we advocate. We think it more moral to prevent the conception of children, than, after they are born, to murder them by want of food, air, and clothing. We advocate scientific checks to population, because, so long as poor men have large families, pauperism is a necessity, and from pauperism grow crime and disease. The wage which would support the parents and two or three children in comfort and decency is utterly insufficient to maintain a family of twelve or fourteen, and we consider it a crime to bring into the world human beings doomed to misery or to premature death. It is not only the hard-working classes which are concerned in this question. The poor curate, the struggling man of business, the young professional man, are often made wretched for life by their inordinately large families, and their years are passed in one long battle to live; meanwhile the woman's health is sacrificed and her life embittered from the same cause. To all of these, we point the way of relief and of happiness; for the sake of these we publish what others fear to issue, and we do it, confident that if we fail the first time, we shall succeed at last, and that the English public will not permit the authorities to stifle a discussion of the most important social question which can influence a nation's welfare.

CHARLES BRADLAUGH.
ANNIE BESANT.

PREFACE TO SECOND NEW EDITION.

We were not aware, when we published the first edition, that the editions published by James Watson, and professing to be reprinted by Holyoake and Co., Austin and Co., F. Farrah, J. Brooks, and Charles Watts, contained any variations. These variations are all of the most unimportant character, but as it was the edition issued by Mr. Watts, which was prosecuted, and as on careful reading we find there are some slight differences, the present edition is reprinted from his, with the exception of errors in printing and grammar.

Charles Bradlaugh.
Annie Besant.

PREFACE.

BY ONE OF THE FORMER PUBLISHERS.

It is a notorious fact that the families of the married often increase beyond what a regard for the young beings coming into existence, or the happiness of those who gave them birth, would dictate; and philanthropists, of first-rate moral character, in different parts of the world, have for years been endeavouring to obtain and disseminate a knowledge of means whereby men and women may refrain at will from becoming parents, without even a partial sacrifice of the pleasure which attends the gratification of their productive instinct. But no satisfactory means of fulfilling this object were discovered until the subject received the attention of a physician, who had devoted years to the investigation of the most recondite phenomena of the human system, as well as to chemistry. The idea occurred to him of destroying the fecundating property of the sperm by chemical agents; and upon this principle he devised "checks," which reason alone would convince us must be effectual, and which have been proved to be so by actual experience.

This work, besides conveying a knowledge of these and other checks, treats of Generation, Sterility, Impotency, &c. &c. It is written in a plain, yet chaste style. The great utility of such a work as this, especially to the poor, is ample apology, if apology be needed, for its publication.

PHILOSOPHICAL PROEM.

CONSCIOUSNESS is not a "principle" or substance of any kind; nor is it, strictly speaking, a property of any substance or being. It is a peculiar action of the nervous system; and the nervous system is said to be sensible, or to possess the property of sensibility, because those sentient actions which constitute our different consciousnesses, may be excited in it. The nervous system includes not only the brain and spinal marrow, but numerous soft white cords, called nerves, which extend from the brain and spinal marrow to every part of the body in which a sensation can be excited.

A sensation is a sentient action of a nerve and the brain; a thought or idea (both the same thing) is a sentient action of the brain alone. A sensation, or a thought, is consciousness, and there is no consciousness but that which consists either in a sensation or a thought.

Agreeable consciousness constitutes what we call happiness, and disagreeable consciousness constitutes misery. As sensations are a higher degree of consciousness than mere thoughts, it follows, that agreeable sensations constitute a more exquisite happiness than agreeable thoughts. That portion of happiness which consists in agreeable sensations is commonly called *pleasure*. No thoughts are agreeable except those which were originally excited by, or have been associated with, agreeable sensations. Hence if a person never had experienced any agreeable sensations, he could have no agreeable thoughts; and would of course be an entire stranger to happiness.

There are five species of sensation, seeing, hearing, smelling, tasting, and feeling. There are many varieties of feeling—as the feeling of hunger, thirst, cold, hardness, &c. Many of these feelings are excited by agents that act upon the exterior of the body, such as solid substances of every kind, heat, and various chemical irritants. Other feelings owe their existence to states or conditions of internal organs. These latter feelings are called *passions*.

Those passions which owe their existence chiefly to the state of the brain, or to causes acting directly upon the brain, are called the moral passions. They are grief, anger, love, &c. They consist of sentient actions which commence in the brain and extend to the nerves in the region of the stomach, heart, &c. But when the cause of the internal feeling or passion is seated in some organ remote from the brain, as in the stomach, the genital organs, &c.,

the sentient action which constitutes the passion, commences in the nerves of such organ, and extends to the brain; and the passions is called an *appetite, instinct* or *desire*. Some of these passions are natural, as hunger, thirst, the reproductive instinct, the desire to urinate, &c. Others are gradually acquired by habit. A *hankering* for stimulants, as spirits, opium and tobacco, is one of these.

Such is the nature of things that our most vivid and agreeable sensations cannot be excited under all circumstances, nor beyond a certain extent under any circumstances, without giving rise, in one way or another, to an amount of disagreeable consciousness, or misery, exceeding the amount of agreeable consciousness, which attend such ill-timed or excessive gratification. To excite agreeable sensations to a degree not exceeding this certain extent, is temperance; to excite them beyond this extent, is intemperance; not to excite them at all is mortification or abstinence. This certain extent varies with different individuals, according to their several circumstances, so that what would be temperance in one person may be intemperance in another.

To be free from disagreeable consciousness, is to be in a state which compared with a state of misery, is a happy state; yet absolute happiness does not consist in the absence of misery—if it do, rocks are happy. It consists, as aforesaid, in agreeable consciousness. That which enables a person to excite or maintain agreeable consciousness, is not happiness; but the *idea* of having such in one's possession is agreeable, and of course is a portion of happiness. Health and wealth go far in enabling a person to excite and maintain agreeable consciousness.

That which gives rise to agreeable consciousness is *good*, and we desire it. If we use it intemperately, such use is bad, but the thing itself is still good. Those acts (and intentions are acts of that part of man which intends) of human beings which tend to the promotion of happiness are good; but they are also called *virtuous*, to distinguish them from other things of the same tendency. There is nothing for the word *virtue* to signify but virtuous actions. Sin signifies nothing but sinful actions; and sinful, wicked, vicious, or bad actions, are those which are productive of more misery than happiness.

When an indiviual gratifies any of his instincts in a *temperate* degree, he adds an item to the sum total of human happiness, and causes the amount of human happiness to exceed the amount of misery, farther than if he had not enjoyed himself, therefore it is virtuous, or, to say the least, it is not vicious or sinful for him so to do. But it must ever be remembered, that this temperate degree depends on circumstances—that one person's health, pecuniary circumstances, or social relations may be such that it would cause more misery than happiness for him to do an act which, being done by a person under different circumstances, would cause more happiness than misery. Therefore it would be right for the latter to perform such act, but not for the former.

Again. Owing to his *ignorance*, a man may not be able to gratify a desire without causing misery (wherefore it would be wrong for him to do it), but with knowledge of means to prevent this misery, he may so gratify it that more pleasure than pain will be the result of the act, in which case the act to say the least is justifiable. Now, therefore, it is virtuous, nay, it is the *duty* for him who has a knowledge of such means, to convey it to those who have it not; for, by so doing, he furthers the cause of human happiness.

Man by nature is endowed with the talent of devising means to remedy or prevent the evils that are liable to arise from gratifying our appetites; and it is as much the duty of the physician to inform mankind of the means of preventing the evils that are liable to arise from gratifying the reproductive instinct, as it is to inform them how to keep clear of the gout or the dyspepsia. Let not the cold ascetic say we ought not to gratify our appetites any farther than is necessary to maintain health, and to perpetuate the species. Mankind will not so abstain, and if means to prevent the evils that may arise from a farther gratification can be devised, they *need not*. Heaven has not only given us the capacity of greater enjoyment, but the talent of devising means to prevent the evils that are liable to arise therefrom; and it becomes us, "with thanksgiving, to make the most of them.

CHAPTER I.

Showing how desirable it is, both in a political and a social point of view, for mankind to be able to limit, at will, the number of their offspring, without sacrificing the pleasure that attends the gratification of the reproductive instinct.

First.—*In a political point of view.*—If population be not restrained by some great physical calamity, such as we have reason to hope will not hereafter be visited upon the children of men, or by some *moral restraint*, the time will come when the earth cannot support its inhabitants. Population, unrestrained, will double three times in a century. Hence, computing the present population of the earth at 1,000 millons, there would be at the end of 100 years from the present time, 8,000 millions.

At the end of 200 years 64,000 millions.
„ 300 „ 512,000 „

And so on, multiplying by eight for every additional hundred years. So that in 500 years from the present time, there would be thirty-two thousand seven-hundred and sixty-eight times as many inhabitants as at present. If the natural increase should go on without check for 1,500 years, one single pair would increase to more than *thirty-five thousand one hundred and eighty-four* times as many as the present population of the whole earth!

Some check, then, there must be, or the time will come when millions will be born but to suffer and to perish for the necessaries of life. To what an inconceivable amount of human misery would such a state of things give rise! And must we say that vice, war, pestilence, and famine are desirable to prevent it? Must the friends of temperance and domstic happiness stay their efforts? Must peace societies excite to war and bloodshed? Must the physician cease to investigate the nature of contagion, and to search for the means of destroying its baneful influence? Must he that becomes diseased be marked as a victim to die for the public good, without the privilege of making an effort to restore

him to health? And in case of a failure of crops in one part of the world, must the other parts withhold the means of supporting life, that the far greater evil of excessive population throughout the globe may be prevented? Can there be no effectual moral restraint, attended with far less human misery than such physical calamities as these? Most surely there can. But what is it? Malthus, an English writer on the subject of population, gives us none but celibacy to a late age. But how foolish it is to suppose that men and women will become as monks and nuns during the very holiday of their existence, and abjure during the fairest years of life the nearest and dearest of social relations, to avert a catastrophe, which they, and perhaps their children, will not live to witness. But, besides being ineffectual, or if effectual, requiring a great sacrifice of enjoyment, this restraint is highly objectionable on the score of its demoralising tendency. It would give rise to a frightful increase of prostitution, of intemperance and onanism, and prove destructive to health and moral feelings. In spite of preaching, human nature will ever remain the same; and that restraint which forbids the gratification of the reproductive instinct, will avail but little with the mass of mankind. The checks to be hereafter mentioned, are the only moral restraints to population known to the writer, that are unattended with serious objections.

Besides starvation with all its accompanying evils, overpopulation is attended with other public evils, of which may be mentioned ignorance and slavery. Where the mass of the people must toil incessantly to obtain support, they must remain ignorant; and where ignorance prevails tyranny reigns.*

* The Scientific part of Malthus's Doctrine of Population is not very clearly or correctly given in the above passages. His great theory, now so generally held by the most eminent political economists, is that the increase of population is always powerfully checked in old countries by the difficulty of increasing the supply of food; that the existing evils of poverty and low wages are really at bottom caused by this check, and are brought about by the pressure of population on the soil, and the continual overstocking of the labour markets with labourers; and hence that the only way in which Society can escape from poverty, with all its miseries, is by putting a strong restraint on their great natural powers of multiplication. "It is not in the nature of things," he says, "that any permanent and general improvement in the condition of the poor can be effected without an increase in the preventive check to population."—G. R.

Second.—*In a social point of view.*—"Is it not notorious that the families of the married often increase beyond what a regard for the young beings coming into the world, or the happiness of those who give them birth, would dictate? In how many instances does the hard-working father, and more especially the mother, of a poor family remain slaves throughout their lives, tugging at the oar of incessant labour, toiling to live, and living but to toil; when, if their offspring had been limited to two or three only, they might have enjoyed comfort and comparative affluence? How often is the health of the mother, giving birth every year to an infant—happy if it be not twins—and compelled to toil on, even at those times when nature imperiously calls for some relief from daily drudgery—how often is the mother's comfort, health, nay, even her life thus sacrificed? Or if care and toil have weighed down the spirit, and at length broken the health of the father, how often is the widow left, unable, with the most virtuous intentions, to save her fatherless offspring from becoming degraded objects of charity, or profligate votaries of vice!

"Nor is this all. Many women are so constituted that they cannot give birth to healthy—sometimes not to living children. Is it desirable—is it moral, that such women should become pregnant? Yet this is continually the case. Others there are, who ought never to become parents; because, if they do, it is only to transmit to their offspring grievous hereditary diseases, which render such offspring mere subjects of misery throughout their sickly existence. Yet such women will not lead a live of celibacy. They marry. They become parents, and the sum of human misery is increased by their doing so. But it is folly to expect that we can induce such persons to live the lives of Shakers. Nor is it necessary;—all that duty requires of them is to refrain from becoming parents. Who can estimate the beneficial effect which a rational moral restraint may thus have on the health and beauty, and physical improvement of our race throughout future generations."

Let us now turn our attention to the case of unmarried youth.

"Almost all young persons, on reaching the age of maturity, desire to marry. That heart must be very cold, or very isolated, that does not find some object on which to bestow its affections. Thus, early marriages would be almost universal did not prudential considerations interfere. The

young man thinks 'I cannot marry yet, I cannot support a family. I must make money first and think of a matrimonial settlement afterwards.'

"And so he goes to making money, fully and sincerely resolved, in a few years to share it with her whom he now loves. But passions are strong and temptations great. Curiosity perhaps introduces him into the company of those poor creatures whom society first reduces to a dependence on the most miserable of mercenary trades, and then curses for being what she has made them. There his health and moral feelings alike make shipwreck. The affections he had thought to treasure up for their first object are chilled by dissipation and blunted by excess. He scarcely retains a passion but avarice. Years pass on—years of profligacy and speculation—and his first wish is accomplished, his fortune is made. Where now are the feelings and resolves of his youth.

'Like the dew on the mountain,
Like the foam on the river,
Like the bubble on the fountain,
They are gone—and for ever.'

"He is a man of pleasure, a man of the world. He laughs at the romance of his youth, and marries a fortune. If gaudy equipage and gay parties confer happiness he is happy. But if they be only the sunshine on the stormy sea below, he is a victim to that system of morality which forbids a reputable connection until the period when provision has been made for a large expected family. Had he married the first object of his choice, and simply delayed becoming a father until his prospects seemed to warrant it, how different might have been his lot. Until men and women are absolved from the fear of becoming parents, except when they themselves desire it, they ever will form mercenary and demoralizing connections, and seek in dissipation the happiness they might have found in domestic life.

"I know that this, however common, is not a universal case. Sometimes the heavy responsibilities of a family are incurred at all risks; and who shall say how often a life of unremitting toil and poverty is the consequence? Sometimes, if even rarely, the young mind does hold to its first resolves. The youth plods through years of cold celibacy and solitary anxiety, happy, if before the best hours of his life are gone, and its warmest feelings withered, he may return to claim

the reward of his forbearance and his industry. But even in this comparatively happy case, shall we count for nothing the years of ascetic sacrifice at which after happiness is purchased? The days of youth are not too many, nor its affections too lasting. We may, indeed, if a great object require it, sacrifice the one and mortify the other. But is this, in itself, desirable? Does not wisdom tell us that such a sacrifice is a dead loss—to the warm-hearted often a grievous one? Does not wisdom bid us temperately enjoy the spring-time of life, 'while the evil day come not, nor the years draw nigh, when we shall say we have no pleasure in them.'

"Let us say, then, if we will, that the youth who thus sacrifices the present for the future, chooses wisely between the two evils, profligacy and asceticism. This is true. But let us not imagine the lesser evil to be a good. It is *not* good for man to be alone. It is for no man or woman's happiness or benefit that the should be condemned to Shakerism. It is a violence done to the feelings and an injury to the character. A life of rigid celibacy, though infinitely preferable to a life of dissipation, is yet fraught with many evils. Peevishness, restlessness, vague longings, and instability of character, are amongst the least of these. The mind is unsettled and the judgment warped. Even the very instinct which is thus mortified assumes an undue importance, and occupies a portion of the thoughts which does not of right or nature belong to it, and which during a life of satisfied affection it would not obtain."

In many instances the genital organs are rendered so irritable by the repletion to which unnatural continency gives rise, and by the much thinking, caused by such repletion, as to induce a disease known to medical men by the name of *Gonorrhœa Dormientium*. It consists in an emission or discharge of the semen during sleep. This discharge is immediately excited in most instances by a lascivious dream, but such dream is caused by the repletion and irritability of the genital organs. It is truly astonishing to what a degree of mental anguish the disease gives rise in young men. They do not understand the nature, or rather, the cause of it. They think it depends on a weakness—indeed the disease is often called a 'seminal weakness'—and that the least gratification in a natural way would but serve to increase it. Their anxiety about it weakens the whole system. This

weakness they erroneously attribute to the discharges, they think themselves totally disqualified for entering into or enjoying the married state. Finally, the genital and mental organs act and react upon each other so perniciously, as to cause a degree of nervousness, debility, emaciation, and melancholy—in a word a wretchedness that sets description at defiance. Nothing is so effectual in curing this diseased state of body and mind in young men as marriage. All restraint, fear, and solicitude should be removed.

"Inasmuch, then as the scruples of incurring heavy responsibilities deter from forming moral connections, and encourage intemperance and prostitution, the knowledge which enables man to limit the number of his offspring, would in the present state of things save much unhappiness and prevent many crimes. Young persons sincerely attached to each other and who might wish to marry, would marry early; merely resolving not to become parents until prudence permitted it. The young man, instead of solitary toil and vulgar dissipation, would enjoy the society and the assistance of her he had chosen as his companion; and the best years of life, whose pleasures never return, would not be squandered in riot, nor lost through mortification."*

CHAPTER II.

On Generation.

I HOLD the following to be important and undeniable truths: That every man has a natural right both to receive and convey a knowledge of all the facts and discoveries of every art and science, excepting such only as may be secured to some particular person or persons by copyright or patent. That a physical truth in its general effect cannot be a moral evil. That no fact in physics or in morals ought to be concealed from the enquiring mind.

Some may make a misuse of knowledge, but that is their fault, and it is not right that one person should be deprived of knowledge, of spirits, of razors, or of anything else which is harmless in itself and may be useful to him, because another may misuse it.

The subject of generation is not only interesting as a

* The passages are quoted from Robert Dale Owen's "Moral Physiology." (Published by E. Truelove.)—[Publishers' Note.]

branch of science, but it is so connected with the happiness of mankind that it is highly important in a practical point of view. Such, to be sure, is the custom of the age that it is not considered a proper subject to investigate before a popular assembly, nor is it proper to attend the calls of nature in a like place, yet they must and ought to be attended to, for the good—the happiness of mankind require it; so to, for like reason the subject of generation ought to be investigated until it be rightly understood by all people, but at such opportunities as the good sense of every individual will easily decide to be proper. This I presume to say, not simply upon the abstract principle that all knowledge of nature's workings is useful, and the want of it disadvantageous, but from the known moral fact, that ignorance of this process has in many instances proved the cause of a lamentable "mishap," and more especially as it is essential to the attainment of the great advantages which it is the chief object of this work to bestow upon mankind.

People generally, as it was the case with physicians until late years, entertain a very erroneous idea of what takes place in the process of conception. Agreeably to this idea, the "check" which I consider far preferable to any other would not be effectual, as would be obvious to all. Consequently, entertaining this idea, people would not have due confidence in it. Hence it is necessary to correct a long held and widely extended error. But this I cannot expect to do by simply saying it is an error. Deeply rooted and hitherto undisputed opinions are not so easily eradicated. If I would convince any one that the steps in one of the most recondite processes of nature are not such as he has always believed, it will greatly serve my purpose to show what these steps are. I must first prepare him to be reasoned with, and then reason the matter all over with him—I must point out the facts which disprove his opinion, and show that my own is unattended with difficulties.

But what can be more obvious than that it is absolutely impossible to explain any process or function of the animal economy so as to be understood, before the names of the organs which perform this function have been defined, that is, before the organs themselves have been described. Now it is well known to every anatomist, and indeed it must be obvious to all, that in describing any organ or system of organs we must always begin with some external and known

part, and proceed regularly, step by step, to the internal and unknown. As in arithmetic, "everything must be understood as you go along."

Fully to effect the objects of this work, it is, therefore, a matter of necessity that I give an anatomical description of certain parts—even external parts—which some, but for what I have just said, might think it useless to mention. It is not to gratify the idle curiosity of the light-minded that this book is written, it is for *utility* in the broad and truly philosophical sense of the term: nay, farther, it shall, with the exception of here and there a little spicing,* be confined to *practical utility*. I shall therefore endeavour to treat of the subject in this chapter so as to be understood, without giving any description of the male organs of generation; though I hold it an accomplishment for one to be able to speak of those organs, as diseases often put them under the necessity of doing, without being compelled to use low and vulgar language. But I must briefly describe the female organs; in doing which, I must, of course, speak as do other anatomists and physiologists; and whoever objects to this will discover more affectation and prudery than good sense and goodwill to mankind.

The adipose, or fatty matter, immediately over the share bone, forms a considerable prominence in females, which, at the age of puberty, is covered with hair, as in males. This prominence is called Mons Veneris.

The exterior orifice commences immediately below this. On each side of this orifice is a prominence continued from the mons veneris, which is largest above and gradually diminishes as it descends. These two prominences are called the Labia Externa, or external lips. Near the latter end of pregnancy they become somewhat enlarged and relaxed, so that they sustain little or no injury during parturition. Just within the upper or anterior commissure formed by the junction of these lips, a little round oblong body is situated. The body is called the clitoris. Most of its length is bound down, as it were, pretty closely to the bone: and it is of very variable size in different females. Instances have occurred where it was so enlarged as to enable the female to have venereal com-

* This is an Americanism, which appears to us to convey a false idea If it refers to the cases used as illustrations, Dr. Knowlton is more sparing in his use of them than either Dr. Bull or Dr. Chavasse.—[Publishers' Note.]

merce with others; and in Paris this fact was once made a public exhibition of to the medical faculty. Women thus formed appear to partake in their general form of the male character, and are termed hermaphrodites. The idea of human beings, called hermaphrodites, which could be either father or mother, is, doubtless, erroneous. The clitoris is analogous in its structure to the penis, and like it, is exquisitely sensible, being, as it is supposed, the principal seat of pleasure. It is subject to erection or distension, like the penis, from like causes.

The skin which lines the internal surface of the external lips is folded in such a manner as to form two flat bodies, the exterior edges of which are convex. They are called the nymphæ. They extend downward, one on each side, from the clitoris to near the middle of the external orifice, somewhat diverging from each other. Their use is not very evident. The orifice of the urethra (the canal, short in females, which leads to the bladder) is situated an inch or more farther inward than the clitoris, and is a little protuberant.

Passing by the external lips, the clitoris, the nymphæ, and the orifice of the urethra, we come to the membrane called the hymen. It is situated just at or a trifle behind the orifice of the urethra. It is stretched across the passage, and were it a complete septum, it would close up the anterior extremity of that portion of the passage which is called the vagina. But the instances in which the septum or partition is complete, are very rare; there being, in almost all cases, an aperture either in its centre, or, more frequently in its anterior edge, giving the membrane the form of a crescent. Through this aperture passes the menstrual fluid. Sometimes, however, this septum is complete, and the menstrual fluid is retained month after month, until appearances and symptoms much like those of pregnancy are produced, giving rise perhaps to unjust suspicions. Such cases require the simple operation of dividing the hymen. In many instances the hymen is very imperfect, insomuch that some have doubted whether it is to be found in the generality of virgins. Where it exists, it is generally ruptured in the first intercourse of the sexes, and the female is said to lose her virginity. In some rare instances it is so very strong as not to be ruptured by such intercourse, and the nature of the difficulty not being understood, the husband has sued for a divorce. But everything may be put to rights by

a slight surgical operation. The parts here described are among those called the external parts of generation.

The internal organs of generation, consist, in the female, of the Vagina, the Uterus, the Ovaries and their appendages.

The Vagina is a membranous canal commencing at the hymen, and extending to the uterus. It is a little curved, and extends backwards and upwards between the bladder, which lies before and above it, and that extreme portion of the bowels called the rectum, which lies behind it. The coat or membrane which lines the internal surface of the vagina forms a number of transverse ridges. These ridges are to be found only in the lower or anterior half of the vagina, and they do not extend all round the vagina, but are situated on its anterior and posterior sides, while their lateral sides are smooth. I mention these ridges because a knowledge of them may lead to a more effectual use of one of the checks to be made known hereafter.

The Uterus, or womb, is also situated between the bladder and the rectum, but above the vagina. Such is its shape that it has been compared to a pear with a long neck. There is, of course, considerable difference between the body and the neck, the first being twice as broad as the last. Each of these parts is somewhat flattened. In subjects of mature age, who have never been pregnant, the whole of the uterus is about two inches and a half in length, and more than an inch and a half in breadth at the broadest part of the body. It is near an inch in thickness. The neck of the uterus is situated downwards, and may be said to be inserted into the upper extremity of the vagina. It extends down into the vagina the better part of an inch. In the uterus is a cavity which approaches the triangular form, and from which a canal passes down through the neck of the uterus into the vagina. This cavity is so small that its sides are almost in contact. So that the uterus is a thick, firm organ for so small a one. Comparing the cavity of the uterus to a triangle, we say the upper side or line of this triangle is transverse with respect to the body, and the other two lines pass downwards and inwards, so that they would form an angle below, did they not before they meet take a turn more directly downwards to form the canal just mentioned. In each of the upper angles there is an orifice of such size as to admit of a hog's bristle. These little orifices are the mouths of two tubes, called the fallopian tubes, of which more will

be said presently. The canal which passes through the neck of the uterus, connecting the cavity of this organ with that of the vagina, is about a quarter of an inch in diameter. It is different from other ducts, for it seems to be a part of the cavity from which it extends, inasmuch as when the cavity of the uterus is enlarged in the progress of pregnancy, this canal is gradually converted into a part of that cavity.

The lower extremity of the neck of the uterus is irregularly convex and tumid. The orifice of the canal in it is oval, and so situated that it divides the convex surface of the lower extremity of the neck in two portions, which are called the lips of the uterus. The anterior is thicker than the posterior. The orifice itself is called *os tincæ* or *os uteri*, or in English, the mouth of the womb. When the parts are in a weak, relaxed state, the mouth or neck of the uterus is quite low, and in almost all cases it may be reached by a finger introduced into the vagina, especially by a second person who carries the hand behind.

The Ovaries are two bodies of a flattened or oval form, one of which is situated on each side of the uterus at a little distance from it, and about as high up as where the uterus becomes narrow to form its neck. The longest diameter of the ovarium is about an inch. Each ovarium has a firm coat of membrane. In those who have not been pregnant, it contains from ten to twenty *vesicles*, which are little round bodies, formed of a delicate membrane, and filled with a transparent fluid. Some of these vesicles are situated so near the surface of the ovarium as to be prominent on its surface. They are of different sizes, the largest nearly a quarter of an inch in diameter.*

In those in whom conception has ever taken place, some of these vesicles are removed, and in their place a cicatrix or scar is formed which continues through life. However, the number of cicatrices does not always correspond with the number of conceptions. They often exceed it, and are sometimes found where conception has not been known to take place.

* The vesicles here mentioned are the so-called Graafian vesicles, or ovisacs, each of which contains in its interior a little ovum or egg. In the human female the ovum is extremely minute, so as only to be visible with the aid of a lens. The Graafian vesicles are not limited to a certain small number, as was formerly thought, but continue to be formed in the ovaries, and to discharge at intervals mature ova during the whole of the fruitful period of life.—G. R.

The Fallopian Tubes are two canals four or five inches in length, proceeding from the upper angles of the cavity of the uterus, in a transverse direction in respect to the body. Having so proceeded for some distance, they turn downwards towards the ovaries. At their commencement in the uterus they are very small, but they enlarge as much as they progress. The large ends which hangs loose, terminate in open mouths, the margins of which consist of fimbriated processes, and nearly touch the ovaria.

We are now prepared to treat of conception. Yet, as menstruation is closely connected with it, and as a knowledge of many things concerning menstruation may contribute much to the well being of females, for whom this work is at least as much designed as for males, I shall first briefly treat of this subject.

Menstruation.—When females arrive at the age of puberty they begin to have a discharge once every month, by way of the vagina, of the colour of blood. This discharge is termed the menses. To have it, is to menstruate. The age at which menstruation commences varies with different individuals, and also in different climates. The warmer the climate the earlier it commences and ceases. In temperate climates it generally commences at the age of fourteen or fifteen, and ceases at forty-four, or a little later.* Whenever it commences the girl acquires a more womanly appearance. It is a secretion of the uterus, or in other words, the minute vessels distributed to the inner coat of the uterus, select as it were, from the blood, and pour out in a gradual manner the materials of this fluid. It has one of the properties, colour, of blood, but it does not coagulate, or separate into different parts like blood, and cannot properly be called blood.† When this discharge is in all respects regular, it amounts in most females to six or eight ounces, and is from two to four days' continuance. During its continuance the woman is said to be

* Dr. Chavasse, on p. 94 of his "Advice to a Wife" (published by W. H. Smith & Son), gives instances of very early menstruation and consequent fecundity.—[Publishers' note.]

† "The menstrual discharge," says Dr. Kirks, "consists of blood effused from the inner surface of the uterus, and mixed with mucus from the uterus, vagina, and external parts of the generative apparatus. Being diluted by this admixture, the menstrual blood coagulates less perfectly than ordinary blood; and the frequent acidity of the vaginal mucus tends still further to diminish its coagulability."—"Handbook of Physiology," 8th ed., p. 727, 1874.—G. R.

unwell, or out of order. Various unpleasant feelings are liable to attend it; but when it is attended with severe pain, as it not unfrequently is, it becomes a disease, and the woman is not likely to conceive until it be cured. During the existence of the "turns," or "monthlies," as they are often called, indigestible food, dancing in warm rooms, sudden exposure to cold or wet, and mental agitations should be avoided as much as possible. The "turns" do not continue during pregnancy, nor nursing, unless nursing be continued too long. The milk becomes bad if nursing be continued after the "turns" recommence. Some women, it is true, are subject to a slight hœmorrhage that sometimes occurs with considerable regularity during pregnancy, and which has led them to suppose they have their turns at such terms; but it is not so; the discharge at such times is real blood.*

The use of the menstrual discharge seems to be, to prepare the uterine system for conception. For females do not become pregnant before they commence, nor after they cease having their turns; nor while they are suppressed by some disease, by cold or by nursing. Some credible women, however, have said that they become pregnant while nursing, without having had any turn since their last lying-in. It is believed that in these cases they had some discharge, colourless perhaps, which they did not notice, but which answered the purposes of the common one. Women are not nearly so likely to conceive during the week before a monthly, as during the week immediately after.† But although the use of this secretion seems to be to prepare for conception, it is not to be inferred that the reproductive instinct ceases at the "turn of life," or when the woman ceases to menstruate. On the contrary, it is said that this passion often increases at this period, and continues in a greater or less degree to an extreme age.

Conception.—The part performed by the male in the reproduction of the species consists in exciting the orgasm of the female, and depositing the semen in the vagina. Before I inquire what takes place in the females, I propose to speak of the semen.

This fluid, which is secreted by the testicles, may be said to

* Consult on the whole of this Dr. Chavasse's book, pp. 91—101, where full details are given.—[Publishers' note.]

† See, however, Dr. Bull's "Hints to Mothers," pp. 51—58, and 127—129 (published by Longmans, Green & Co.)—[Publishers' note.]

possess three kinds of properties, physical, chemical, physiological. Its physical properties are known to every one—it is a thickish, nearly opaque fluid, of a peculiar odour, saltish taste, &c. As to its chemical properties, it is found by analysis to consist of 900 parts of water, 60 of animal mucillage, 10 of soda, 30 of phosphate of lime. Its physiological property is that of exciting the female genital organs in a peculiar manner.

When the semen is examined by a microscope, there can be distinguished a multitude of small animalculæ, which appear to have a rounded head and a long tail. These animalculæ move with a certain degree of rapidity. They appear to avoid the light and to delight in the shade. Leeuwenhoek, if not the discoverer of the seminal animalculæ, was the first who brought the fact of their existence fully before the public. With respect to their size, he remarked that ten thousand of them might exist in a space not larger than a grain of sand. They have a definite figure, and are obviously different from the animalculæ found in any other fluid.* Leeuwenhoek believed them to be the beginnings of future animals—that they are of different sexes, and even thought he could discover a difference of sex, uponwhich depends the future sex of the fœtus. Be this as it may, it appears to be admitted on all hands that the animalculæ are present in the semen of the various species of male animals, and that they cannot be detected when either from age or disease the animals are rendered sterile. "Hence," says Bostock, "we can scarcely refuse our assent to the position, that these animalculæ are in some way or other instrumental to the production of the fœtus." The secretion of the semen commences at the age of puberty. Before this period the testicles secrete a viscid, transparent fluid, which has never been analysed, but which is doubtless essentially different from semen. The revolution which the whole economy undergoes at this period, such as the tone of the voice, the development of hairs, the beard, the increase of the muscles and bones, &c., is intimately connected with the existence of the testicles and the secretion of this fluid.† "Eunuchs preserve the same form as in childhood; their voice is effeminate, they have no beard, their dis-

* See Dr. Carpenter's "Animal Physiology," p. 558 (published by H. G. Bohn); Nichol's "Human Physiology," pp. 253—255 (published by Trubner & Co.)—[Publishers' note.]

† Nichol's "Human Physiology," pp. 255, 256.—[Publishers' note.]

position is generally timid; and finally their physical and moral character very nearly resembles that of females, Nevertheless, many of them take delight in venereal intercourse, and give themselves up with ardour to a connexion which must always be unfruitful."*

The part performed by the female in the reproduction of the species is far more complicated than that performed by the male. It consists, in the first instance, in providing a substance, which, in connection with the male secretion, is to constitute the fœtus; in furnishing a suitable situation in which the fœtus may be developed; in affording due nourishment for its growth; in bringing it forth, and afterwards furnishing it with food especially adapted to the digestive organs of the young animal. Some parts of this process are not well understood, and such a variety of hypotheses have been proposed to explain them, that Drelincourt, who lived in the latter part of the 17th century, is said to have collected 260 hypotheses of generation.

It ought to be known that women have conceived when the semen was merely applied to the parts anterior to the hymen, as the internal surface of the external lips, the nymphæ, &c. This is proved by the fact that several cases of pregnancy have occurred when the hymen was entire. This fact need not surprise us; for, agreeable to the theory of absorption, we have to account for it only to suppose that some of the absorbent vessels are situated anterior to the hymen—a supposition by no means unreasonable.

There are two peculiarities of the human species respecting conception, which I will notice. First, unlike other animals, they are liable—and for what has been proved to the contrary, equally liable—to conceive at all seasons of the year. Second, a woman rarely, if ever, conceives until after having had several sexual connections; nor does one connection in fifty cause conception in the matrimonial state, where the husband and wife live together uninterruptedly. Public women rarely conceive, owing probably to a weakened state of the genital system, induced by too frequent and promiscuous intercourse.

It is universally agreed, that some time after a fruitful connection, a vesicle (two in case of twins) of one or the other ovary becomes so enlarged that it bursts forth from the ovary,

* Magendie's Physiology.— [Author's note.]

and takes the name of ovum ; which is taken up, or rather received, as it bursts forth, by the fimbriated extremity of the fallopian tube, and is then slowly conducted along the tube into the uterus to the inner surface of which it attaches itself.* Here it becomes developed into a full-grown fœtus, and is brought forth about forty-two weeks from the time of conception by a process termed parturition. But one grand question is, how the semen operates in causing the vesicle to enlarge, etc. ; whether the semen itself or any part thereof reaches the ovary, and if so, in what way it is conveyed to them. It was long the opinion that the semen was ejected into the uterus in the act of coition, and that it afterwards by some unknown means found its way into and along the fallopian tubes to the ovary. But there are several facts which weigh heavily against this opinion, andsome that entirely forbid it. In the first place, there are several well-attested instances in which impregnation took place while the hymen remained entire ; where the vagina terminated in the rectum, and where it was so contracted by a cicatrix as not to admit the penis. In all these cases the semen could not have been lodged anywhere near the mouth of the uterus, much less ejected into it. Secondly, it has followed a connection where, from some defect in the male organs, as the

* Since Dr. Knowlton's work was written, the very important fact has been discovered that ova are periodically discharged from the ovaries in the human female and other animals, not in consequence of fruitful connection having taken place, as was formerly believed, but quite independently of intercourse with the male. Such a discharge of ova occurs in the lower animals at the time of heat or rut, and in women during menstruation. At each menstrual period, a Graafian vesicle becomes enlarged, bursts, and lets the ovum which it contains escape into the Fallopian tube, along which it passes to the uterus. "It has long been known," says Dr. Kirke, "that in the so-called oviparous animals, the separation of ova from the ovary may take place independently of impregnation by the male, or even of sexual union. And it is now established that a like maturation and discharge of ova, independently of coition, occurs in Mammalia, the periods at which the matured ova are separated form the ovaries and received into the Fallopian tubes being indicated in the lower Mammalia by the phenomena of *heat* or *rut* ; in the human female by the phenomena of *menstruation*. Sexual desire manifests itself in the human female to a greater degree at these periods, and in the female of mammiferous animals at no other time. If the union of the sexes takes place, the ovum may be fecundated, and if no union occur it perishes. From what has been said, it may, therefore, be concluded that the two states, heat and menstruation, are analogous, and that the essential accompaniment of both is the maturation and extrusion of ova."—"Handbook of Physiology," p. 724.—G. R.

urethra terminating some inches behind the end of the penis, it is clear that the semen could not have been injected into the uterus, nor even near its mouth. Third, the neck of the unimpregnated uterus is so narrow as merely to admit a probe, and is filled with a thick tenacious fluid, which seemingly could not be forced away by any force which the male organ possesses of ejecting the semen, even if the mouth of the male urethra were in apposition with that of the uterus. But, fourth, the mouth of the uterus is by no means fixed. By various causes it is made to assume various situations, and probably the mouth of the urethra rarely comes in contact with it.

Fifth. "The tenacity of the male semen is such as renders its passage through the small aperture in the neck of the uterus impossible, even by a power or force much superior to that which we may rationally suppose to reside in the male organs of generation.

Sixth. "Harvey and De Graaf dissected animals at almost every period after coition, for the express purpose of discovering the semen, but were never able to detect the smallest vestige of it in the uterus in any one instance.*

Aware of the insurmountable objections to this view of the manner in which the semen reaches the ovary, it has been supposed by some physiologists that the semen is absorbed from the vagina into the great circulating system, where it is mixed, of course, with the blood, and goes the whole round of the circulation, subject to the influence of those causes which produce great changes in the latter fluid.

To this hypothesis it may be objected, that while there is no direct evidence in support of it, it is exceedingly unreasonable, inasmuch as we can scarcely believe that the semen can go the whole round of circulation, and then find its way to the ovary in such a pure unaltered state as the experiments of Spallanzani prove it must be in, that it may impregnate.

A third set of theorists have maintained that an imperceptible something, which they have called *aura seminalis*, passes from the semen lodged in the vagina to the ovary, and excites those actions which are essential to the development of an ovum. Others, again, have told us, that it is all done by sympathy. That neither the semen nor any volatile part of

* Dewees' Essay on Superfœtation.—[Author's note.]

it finds its way to the ovary; but that the semen excites the parts with which it is in contact in a peculiar manner, and by a law of the animal economy, termed sympathy or consent of parts, a peculiar action commences in the ovary, by which an ovum is developed, &c."

To both these conjectures it may be objected, that they have no other foundation but the supposed necessity of adopting them, to account for the effect of impregnation; and further, they "make no provision for the formation of mules; for the peculiarities of, and likeness to, parents, and for the propagation of predisposition to disease, from parent to child; for the production of mulattoes, &c.

A fifth, and, to me, far more satisfactory view of the subject than any other, is that advanced by our distinguished countryman, Dr. Dewees, of Philadelphia. It appears to harmonize with all known facts relating to the subject of conception; and something from analogy may also be drawn in its favour. It is this: that there is a set of absorbent vessels leading directly from the inner surface of the *labiæ externa* and the vagina to the ovaries, the whole office of which vessels is, to absorb the semen and convey it to the ovaries.* I do not know that these vessels have yet been fully discovered; but in a note on the sixteenth page of his "Essays on Various Subjects," the doctor says: "The existence of these vessels is now rendered almost certain, as Dr. Gartner, of Copenhagen, has discovered a duct leading from the ovary to the vagina."

* This view is not held at the present day. The commonly received doctrine now is that the seminal fluid enters the uterus, whether during the intercourse or after it, and passes along the Fallopian tubes to the ovaries; and that fecundation takes place at some point of this course, most frequently in the tubes, but also at times in the ovary itself, or even, perhaps, in the uterus. It is essentially necessary for fecundation that the spermatozoa should come into actual contact with the ovum. "That the spermatozoa make their way towards the ovarium, and fecundate the ovum either before it entirely quits the ovisac or very shortly afterwards," says Dr. Carpenter, "appears to be the general rule in regard to the Mammalia; and their power of movement must obviously be both vigorous and long continued to enable them to traverse so great an extent of mucus membrane, especially when it is remembered that they ascend in opposition to the direction of the ciliary movement of the epithetial cells, and to the downward peristaltic action of the Fallopian tubes . . There can be no doubt that it is in the contact of the spermatozoa with the ovum, and in the changes which occur as the immediate consequence of that contact, that the act of fecundation essentially consists."—"Principles of Human Physiology," 8th ed., p. 961, 1876.—G. R.

Another question of considerable moment relating to generation is, from which parent are the first rudiments of the fœtus derived.

The earliest hypothesis with which we are acquainted, and which has received the support of some of the most eminent of the moderns, ascribes the original formation of the fœtus to the combination of particles of matter derived from each of the parents. This hypothesis naturally presents itself to the mind as the obvious method of explaining the necessity for the co-operation of the two sexes, and the resemblance in external form, and even in mind and character, which the offspring frequently bears to the male parent. "The principal objections," says Bostock, "to this hypothesis, independent of the want of any direct proof of a female seminal fluid, are of two descriptions, those which depend upon the supposed impossibility of unorganised matter forming an organised being, and those which are derived from observations and experiments of Haller and Spallanzani, which they brought forward in support of their theory of pre-existent germs.

In relation to these objections I remark, first, that those whose experience has been with hale females, I suspect can have no doubt but that the female orgasm increases like that of the male, until an emission of fluid of some kind or other takes place. But whether this secretion may properly be called semen, whether any part of it unites with the male semen in forming the rudiments of the fœtus, is another question. For my part I am inclined to the opinion that it does not.* I rather regard it as the result of exalted excitation, analogous to the increased secretion of other organs from increased stimulation; and if it be for any object or use, as it probably is, it is that of affording nature a means of relieving herself; or, in other words, of quieting the venereal passion. If this passion, being once roused, could not by some means or other be calmed, it would command by far too great a proportion of our thoughts, and with many constitutions, the individuals, whether male or female, could not conduct themselves with due decorum. One fact which

* With regard to this secretion in the female, which has nothing of a seminal character, Dr. Carpenter observes, "Its admixture with the male semen has been supposed to have some connection with impregnation; but no proof whatever has been given that any such admixture is necessary."—"Human Physiology," p. 961.—D. R.

leads me to think that the female secretion in the act of coition is not essential to impregnation, is, that many females have conceived, if their unbiassed testimony may be relied on, when they experienced no pleasure. In these cases it is more than probable that there was no orgasm, nor any secretion or emission of fluid on the part of the female.

As to the objection of the supposed impossibility of unorganised matter forming an organised being, I do not conceive that it weighs at all against the hypothesis before us, for I do not believe such a thing takes place, even if we admit that "the original formation of the fœtus is a combination of particles of matter derived from each of the parents." What do, or rather what ought we to mean by organised matter? Not surely, that it exhibits some obvious physical structure, unlike what is to be found in inorganic matter, but that it exhibits phenomena, and of course may be said to possess properties unlike any kind of inorganic matter. Matter unites with matter in three ways, mechanically, chemically, and organically, and each mode of union gives rise to properties peculiar to itself. When matter unites organically, the substance or being so formed exhibits some phenomena essentially different from what inorganic bodies exhibit. It is on this account that we ascribe to organic bodies certain properties, which we call physiological properties, such as contractility, sensibility, life, &c. When, from any cause, these bodies have undergone such a change that they no longer exhibit the phenomena peculiar to them, they are said to have lost these properties, and to be dead. A substance need not possess all the physiological properties of an animal of the higher orders, to entitle it to the name of an organized or living substance, nor need it possess the physical property of solidity. The blood, as well as many of the secretions, does several things, exhibits several phenomena, which no mechanical or mere chemical combinations of matter do exhibit. We must therefore ascribe to it certain physiological properties, and regard it as an organised, a living fluid, as was contended by the celebrated John Hunter. So with respect to the semen, it certainly possesses physiological properties, one in particular, peculiar to itself, namely, the property of impregnating the female; and upon no sound principle can it be regarded in any other light than as an organised, and of course a living fluid. And if the female secretion or any part of it unite with the male secretion in

the formation of the rudiments of the fœtus in a different manner than any other substance would, then it certainly has the property of doing so, whether we give this property a name or not; and a regard to the soundest principles of physiology compels us to class this property with the physiological or vital, and of course to regard this secretion as an organised and living fluid. So, then, unorganised matter does not form an organised being, admitting the hypothesis before us as correct.

That organised beings should give rise to other organised beings under favourable circumstances as to nourishment, warmth, &c., is no more wonderful than that fire should give rise to fire when air and fuel are present. To be sure, there are some minute steps in the process which are not fully known to us; still, if they ever should be known, we should unquestionably see that there is a natural cause for every one of them; and that they are all consonant with certain laws of the animal economy. We should see no necessity of attempting to explain the process of generation by bringing to our aid, or rather to the darkening of the subject, any imaginary principle, as the *nisus formativus* of Blumenbach.

As to the "observations and experiments of Haller and Spallanzani," I think with Dr. Bostock that they weigh but little, if any, against the theory before us. I shall not be at the labour of bringing them forward, and shewing their futility as objections to this theory, for I am far from insisting on the correctness of it; that is, I do not insist that any part of the female secretion, during coition, unites with the male semen in the formation of the rudiments of the fœtus.

The second hypothesis or theory I shall notice, as to the rudiments of the fœtus, is that of Leeuwenhoek, who regarded the seminal animalcules of the male semen as the proper rudiments of the fœtus, and thinks that the office of the female is to afford them a suitable receptacle, where they may be supported and nourished until they are able to exist by the exercise of their own functions. This is essentially the view of the subject which I adopt, and which I intend to give more particularly presently.

I know of no serious objections to this hypothesis, nothing but the "extreme improbability," as its opponents say, "that these animalculæ should be the rudiments of beings so

totally dissimilar to them." But I wish to know if there is more difference between a fœtus and a seminal animalcule, than there is between a fœtus and a few material particles in some other form than that of such animalcule?

The third hypothesis, or that of pre-existing germs, proceeds upon a precisely opposite view of the subject to that of Leeuwenhoek, namely, that the fœtus is properly the production of the female; that it exists previous to sexual congress, with all its organs, in some part of the uterine system; and that it receives no proper addition from the male, but that the seminal fluid acts merely by exciting the powers of the fœtus, or endowing it with vitality.

It is not known who first proposed this hypothesis; but, strange as it may appear, it has had the support of such names as Bonnet, Haller, and Spallanzani, and met with a favourable reception in the middle of the last century. Agreeable to this hypothesis, our common mother, Eve, contained a number of homuncules (little men) one within another, like a nest of boxes, and all within her ovaries, equal to all the number of births that have ever been, or ever will be, not to reckon abortions! Were I to bring forward all the facts and arguments that have been advanced in support of this idea, it seems to me I should fail to convince sound minds of its correctness; as to arguments against it, they surely seem uncalled for. Having now presented several hypotheses of generation, some as to the manner in which the semen reaches or influences the ovary, and others as to the rudiments of the fœtus, I shall now bring together those views which upon the whole appear to me the most satisfactory.

I believe with Dr. Dewees that a set of absorbent vessels extend from the innermost surface of the *labia externa*, and from the vagina to the ovary, the whole office of which is to take up the semen or some part thereof and convey it to the ovary. I believe with Leeuwenhoek, that the seminal animalcules are the proper rudiments of the fœtus, and are perhaps of different sexes, that in case of impregnation one of them is carried not only to, but into a vesicle of an ovary, which is in a condition to receive, and be duly affected by it.* It

* The opinion that the spermatozoa or seminal filaments are real animalcules is now abandoned, but it is held by Dr. Carpenter and other authorities that they do actually, as here stated, penetrate into the interior of the ovum. "The nature of impregnation," says Dr. Hermann,

is here surrounded by the albuminous fluid which the vesicle contains. This fluid being somewhat changed in its qualities by its new comer, stimulates the minute vessels of the parts which surround it, and thus causes more of this fluid to be formed, and while it affords the animalcule material for its development, it puts the delicate membrane of the ovary which retains it in its place upon the stretch, and finally bursts forth surrounded probably by an exceedingly delicate membrane of its own. This membrane with the albuminous fluid it contains, and the animalcule in the centre of it, constitutes the ovum or egg. It is received by the fimbriated extremity of the fallopian tube, which by this time has grasped the ovary, and is by this tube slowly conveyed into the uterus, to the inner surface of which it attaches itself, through the medium of the membrane, which is formed by the uterus itself in the interim, between impregnation and the arriving of the ovum in the way I have just mentioned.

The idea that a seminal animalcule enters an ovum while it remains in the ovary, was never before advanced to my knowledge; hence I consider it incumbent upon me to advance some reasons for the opinion.

First, it is admitted on all hands, that the seminal animalcule are essential to impregnation, since "they cannot be detected when either from age or disease the animal is rendered sterile."

Second, the ovum is impregnated while it remains in the ovary. True, those who have never met with Dr. Dewees' theory, and who, consequently have adopted the idea that the semen is ejected into the uterus, as the least improbable of any with which they were acquainted, have found it very difficult to dispose of the fact that the ovum is impregnated in the ovary, and have consequently presumed this is not generally the case. They admit it is certainly so sometimes, and that it is difficult to reject the conclusion that it is always so. Dr. Bostock—who doubtless had not met with Dewees' theory at the time he wrote, and who admits it impossible to conceive how the semen can find its way along the fallopian

"is as yet unknown. In all probability it is, above all, essential, in order that it should occur, that one or more spermatozoa should penetrate the ovum. At any rate, spermatozoa have been found within the fecundated eggs of the most diverse species of animals."—"Elements of Human Physiology," translated from the 5th ed., by Dr. Gamgee, p. 534, 1875.—G. R.

tubes—how it can find its way towards the ovary farther, at most, than into the uterus, and consequently cannot see how the ovum can be impregnated into the ovary—says: "Perhaps the most rational supposition may be that the ovum is transmitted to the uterus in the unimpregnated state; but there are certain facts which seem almost incompatible with this idea, especially the cases which not unfrequently occur of perfect fœtuses having been found in the tubes, or where they escaped them into the cavity of the abdomen. Hence it is demonstrated that the ovum is occasionally impregnated in the tubes (why did he not say ovaria ?), and we can scarcely resist the conclusion that it must always be the case. * * * "Haller discusses this hypothesis (Bostock's 'most natural supposition, perhaps,') and decides against it." * * * "The experiments of Cruikshank, which were very numerous, and appear to have been made with the requisite degree of skill and correctness, led to the conclusion that the rudiment of the young animal is perfected in the ovarium." * * * "A case is detailed by Dr. Granville, of a fœtus which appears to have been lodged in the body of the ovarium itself, and it is considered by its author as a proof that conception always takes place in this organ." The above quotations are from the third volume of Bostock's Physiology.

Now as the seminal animalculæ are essential to impregnation, and as the ovum is impregnated in the ovarium, what more probable conjecture can we form than an animalcule, as the real proper rudiment of the fœtus, enters the ovum, where, being surrounded with albuminous fluid with which it is nourished, it gradually becomes developed? It may be noticed that Leeuwenhoek estimates that ten thousand animalculæ of the human semen may exist in a space not larger than a grain of sand. There can, therefore, be no difficulty in admitting that they may find their way along exceedingly minute vessels from the vagina, not only to, but into the ovum, while situated in the ovarium.

I think no one can be disposed to maintain that the animalcule merely reaches the surface of the ovum,* and thus impregnates it. But possibly some may contend that its sole office is to stimulate the ovum, and in this way set going

* I say surface of the ovum, for it is probably not a mere drop of fluid, but fluid surrounded with an exceedingly delicate membrane. —[Author's note.]

that train of actions which are essential to impregnation. But there is no evidence in favour of this last idea, and certainly it does not so well harmonise with the fact that the offspring generally partakes more or less of the character of its male parent. As Dr. Dewees says of the doctrine of sympathy: "It makes no provision for the formation of mules; for the peculiarities of, and likeness to, parents; and for the propagation of predisposition to disease from parent to child; for the production of mulattoes, etc."

Considering it important to do away with the popular and mischievous error, that the semen must enter the uterus to effect impregnation, I shall, in addition to what has been already advanced, here notice the experiments of Dr. Haighton. He divided the fallopian tubes in numerous instances, and found that after this operation a fœtus is never produced, but that *corpora lutea* were formed. The obvious conclusions from these facts are, that the semen does not traverse the fallopian tubes to reach the ovaria; yet that the ovum becomes impregnated while in the ovarium, and consequently that the semen reaches the ovarium in some way, except by the uterus and fallopian tubes. I may remark, however, that a *corpus luteum* is not positive proof that impregnation at some time or other has taken place; yet they are so rarely found in virgins that they were regarded as such proof until the time of Blumenbach, a writer of the present century.*

"Harvey and De Graaf dissected animals at almost every period after coition, for the express purpose of discovering the semen, but were never able to detect the smallest vestige of it in the uterus in any one instance."—*Dewees' Essay on Superfœtation.* The fact of superfœtation furnishes a very strong argument against the idea that the semen enters the uterus in impregnation.

A woman being impregnated while she is already impregnated constitutes superfœtation. It is established beyond a doubt that such instances have occurred, yet those who have

* A *corpus luteum* is a little yellowish body, formed in the ovary by changes that take place in the Graafian vesicle, after it has burst and discharged its contents. *Corpora lutea* were formerly considered a sure sign of impregnation, as they were thought to be developed only or chiefly in cases of pregnancy, but it is now known that they occur in all cases where a vesicle has been ruptured and an ovum discharged; though they attain a larger size and are longer visible in the ovary when pregnancy takes place than when it does not.—G. R.

supposed that it is necessary for the semen to pass through the mouth of the uterus to produce conception, have urged that superfœtation could not take place, because, say they—and they say correctly—"so soon as impregnation shall have taken place, the *os uteri* closes, and becomes impervious to the semen, ejected in subsequent acts of coition."

Dr. Dewees relates two cases, evidently cases of superfœtation, that occurred to his own personal knowledge. The first shows that, agreeable to the old theory, the semen must have met with other difficulties than a closed mouth of the uterus—it must have passed through several membranes, as well as the waters surrounding the fœtus, to have reached even the uterine extremity of a fallopian tube. The second case I will give in his own words:—

"A white woman, servant to Mr. H., of Abington township, Montgomery county, was delivered about five and twenty years since of twins, one of which was perfectly white, the other perfectly black. When I resided in that neighbourhood I was in the habit of seeing them almost daily, and also had frequent conversations with Mrs. H. respecting them. She was present at their birth, so that no possible deception could have been practised respecting them. The white girl is delicate, fair-skinned, light haired, and blue-eyed, and is said very much to resemble the mother. The other has all the characteristic marks of the African; short of stature, flat, broad-nosed, thick-lipped, woolly-headed, flat-footed, and projecting heels; she is said to resemble a negro they had on the farm, but with whom the woman never would acknowledge an intimacy; but of this there was no doubt, as both he and the white man with whom her connexion was detected, ran from the neighbourhood so soon as it was known the girl was with child."

I am aware that some have thought they had actually discovered semen in the uterus, while Ruysch, an anatomist of considerable eminence, who flourished at the close of the 17th century, asserted in the most unequivocal manner, that he found the semen in its gross white state in one of the fallopian tubes of a woman, who died very soon after, or during the act of coition; but, says Dewees, "the semen, after it has escaped from the penis, quickly loses its albuminous appearance, and becomes as thin and transparent as water. And we are certain that Ruysch was mistaken. Some alteration in the natural secretion of the parts was mistaken for semen.

This was nowise difficult for him to do, as he had a particular theory to support, and more especially as this supposed discovery made so much for it. It is not merely speculative when we say that some change in the natural secretion of the parts may be mistaken for semen; for we have the testimony of Morgagni on our side. He tells us he has seen similar appearances in several instances in virgins and others, who had been subject during their lives to leucorrhœa, and that it has been mistaken by some for male semen."

On the whole I would say, that in some instances, where the mouth of the uterus is uncommonly relaxed, the semen may, as it were, accidentally have found its way into it; but that is not generally the case, nor is it essential to impregnation; and further, that whatever semen may at any time be lodged in the uterus, has nothing to do with conception. It is not consistent with analogy to suppose that the uterus has vessels for absorbing the semen and conveying it to the ovaria, considering the other important functions which we know it performs.

The circumstances under which a female is most likely to conceive are, first, when she is in health; second, between the ages of twenty-six and thirty; third, after she has a season been deprived of those intercourses she had previously enjoyed; fourth, soon after menstruating. Respecting this latter circumstance, Dr. Dewees remarks, "Perhaps it is not erring greatly to say, that the woman is liable to conceive at any part of the menstrual interval. It is generally supposed, however, that the most favourable instant is, immediately after the catamenia have ceased;" perhaps this is so as a general rule, but it is certainly liable to exceptions,* and he relates the following case which occurred to his own notice:—

* This view, which concerns a question of the utmost practical importance, is held at the present day by the great majority of physiologists. It is believed that although conception may occur at other times, it is much more likely to happen from intercourse a few days before or after the menstrual periods; that is to say, during the time when ova are in process of being ripened and detached from the ovaries, and before they perish and are conveyed out of the body. "There is good reason to believe," says Dr. Carpenter, "that in the human female the sexual feeling becomes stronger at the period of menstruation; and it is quite certain that there is a greater aptitude for conception, immediately before and after that epoch, than there is at any immediate period. This question has been made the subject of special inquiry by M. Raciborski, who affirms that the exceptions to the rule—that conception occurs immediately before or after, or during menstruation—are not more than 6 or 7

"The husband of a lady who was obliged to absent himself many months in consequence of the embarrassment of his affairs, returned one night clandestinely; his visit being only known to his wife, his mother, and myself. The consequence of this visit was the impregnation of his wife. The lady was at this time within a week of her menstrual period; and as this did not fail to take place, she was led to hope she had not suffered by the visit of her husband. But her catamenia not appearing at the next period, gave rise to a fear that she had not escaped; and the birth of a child nine months and thirteen days from the night of this clandestine visit, proved her apprehensions too well grounded."

I think this case is an exception to a general rule; and, furthermore, favours an idea which reason and a limited observation, rather than positive knowledge, has led me to advance above, namely, that a woman is more likely to conceive, other things being the same, after being deprived for a season of those intercourses she had previously enjoyed. Had this lady's husband remained constantly at home, she would probably either not have conceived at all, or have done so a fortnight sooner than she did.

This case is also remarkable for two other facts; one "that a woman in perfect health, and pregnant with a healthy child, may exceed the period of nine months by several days; the other, that a check is not always immediately given to the catamenial flow, by an ovum being impregnated." Probably it is not so generally so as many suppose.

The term of utero-gestation, or the length of time from conception to the commencement of labour, is not precisely determined by physiologists. "It seems, however," says Dr. Dewees, "from the best calculations that can be made, that nine calendar months, or forty weeks, approaches the truth so nearly, that we can scarcely need desire more accuracy, could it be obtained." Unquestionably, however, some cases

per cent. Indeed, in his latest work on the subject, he gives the details of 15 cases, in which the date of conception could be accurately fixed, and the time of the last appearance of the catamenia was also known, and in all but one of them, the correspondence between the two periods was very close."—"Human Physiology," p. 959. So, too, Dr. Kirkes remarks, that "although conception is not confined to the periods of menstruation, yet it is more likely to occur within a few days after cessation of the menstrual flux than at other times."—"Handbook of Physiology," p. 725.

exceed this period by many days, or even weeks, and it has been a question much agitated, how far this period is ever exceeded. It is a question of some moment in a legal point of view. Cases are reported where the usual period was exceeded by five or six months; cases, too, where the circumstances attending them, and the respectability of their reporters are such as to command our belief. Dr. Dewees has paid much attention to this subject, and he declares himself entirely convinced, "that the commonly fixed period may be extended from thirteen days to six weeks, under the influence of certain causes or peculiarities of constitution.*

These occasional departures from the general rule, will, perhaps be the more readily admitted when we consider that they are not confined to the human species. From the experiments of Tessier it appears that the term of utero-gestation varies greatly with the cow, sheep, horse, swine, and other animals to which his attention was directed.

Properly connected with the subject of generation, are the signs of pregnancy. Dr. Dewees remarks that "our experience furnishes no certain mark by which the moment conception takes place is to be distinguished. All appeals by the women to particular sensations experienced at the instant should be very guardedly received, for we are certain they cannot be relied upon; for enjoyment and indifference are alike fallacious. Nor are certain nervous tremblings, nausea, palpitation of the heart, the sensation of something flowing from them during coition, &c., more to be relied upon." Burns, however, says, "some women feel, immediately after conception, a peculiar sensation, which apprises them of their situation, but such instances are not frequent, and generally the first circumstances which lead a woman to suppose herself pregnant, are the suppression of the menses;" a fickle appetite, some sickness, perhaps vomiting, especially in the morning; returning qualms, or langour in the afternoon; she is liable to heartburn, and to disturbed sleep. The breasts at first often become smaller, sometimes tender; but about the third month they enlarge, and occasionally become painful. The nipple is surrounded with an areola or circle of a brown colour, or at least of a colour sensibly deeper or darker than before.

* See tables in Dr. Bull's "Hints to Mothers," pp. 130-141.—[Publishers' note.]

She loses her looks, becomes paler, and the under part of the lower eyelid is often somewhat of a leaden hue. The features become sharper, and sometimes the whole body begins to emaciate, while the pulse quickens. In many instances particular sympathies take place, causing salivation, toothache, jaundice, &c. In other cases very little disturbance is produced, and the woman is not certain of her condition until the time of quickening, which is generally about four months from conception. It is possible for women to mistake the effects of wind for the motion of the child, especially if they have never borne children, and be anxious for a family ; but the sensation produced by wind in the bowels is not confined to one spot, but is often felt at a part of the abdomen where the motion of a child could not possibly be felt. Quite as frequently, perhaps, do fleshy women think themselves dropsical, and mistake motions of the child for movements of water within the abdominal cavity. The motion of the child is not to be confounded with the sensation sometimes produced by the uterus rising out of the pelvis, which produces the feeling of fluttering. At the end of the fourth month the uterus becomes so large that it is obliged to rise out of the pelvis, and if this elevation takes place suddenly, the sensation accompanying it is pretty strong, and the woman at the time feels sick or faint, and in irritable habits, even a hysterical fit may accompany it. After this the morning sickness and other sympathetic effects of pregnancy generally abate, and the health improves.

Very soon after impregnation, if blood be drawn, and suffered to stand a short time undisturbed, it will become sizy, of a yellowish or blueish colour, and somewhat of an oily appearance. But we cannot from such appearances of the blood alone pronounce a woman pregnant, for a suppression of the menses, accompanied with a febrile state, may give the blood a like appearance as pregnancy, so also may some local disease. Of the above mentioned symptoms, perhaps there is no *one* on which we can place more reliance than the increased colour of the circle around the nipple.*

Six or eight weeks after conception, the most sure way of ascertaining pregnancy is to examine the mouth and neck of the uterus, by way of the vagina. The uterus will be found lower down than formerly, its mouth is not directed so much

* See "Advice to a Wife." P. H. Chavasse, pp. 115-124, where many details are given.—[Publishers' note.]

forward as before impregnation, it is more completely closed, and the neck is felt to be thicker, or increased in circumference. When raised on the finger it is found to be heavier or more resisting. Whoever makes this examination must have examined the same uterus in an unimpregnated state, and retained a tolerably correct idea of its feeling at that time, or he will be liable to uncertainty, because the uterus of one woman is naturally different in magnitude from that of another, and the uterus is frequently lower down than natural, from other causes than pregnancy.*

It has not been fully ascertained how long it is after a fruitful connection before any effect is produced upon the ovaria, that is, before any alteration could be discovered, were the female to be dissected. But Haighton's experiments have established the fact, that with rabbits, whose term of utero-gestation is but thirty days, no effect is propagated to the ovaria until nearly fifty hours after coition; we should judge, therefore, that with the human species it must be several days, and it is generally estimated by physiologists that the ovum does not reach the uterus until the expiration of twenty days from the time of connection.†

It is probable that in all cases in which any matter is absorbed from any part of the animal system, some little time is required for such matter, after its application, to stimulate and arouse the absorbent vessels to action; hence it is probable, that after the semen is lodged in the vagina, it is many minutes, possibly some hours, before any part of it is absorbed.

* No one but a doctor, or one trained in physiology, could, of course, make any such examination with safety and utility.—[Publishers' note.]

† "The time occupied in the passage of the ovum, from the ovary to the uterus," says Dr. Kirkes, "occupies probably eight or ten days in the human female."—"Handbook of Physiology," p. 741.—G. R.

CHAPTER III.

Of Promoting and Checking Conception.

STERILITY depends either on imperfect organisation, or imperfect action of the organs of generation. In the former cases, which are rare, the menses do not generally appear, the breasts are not developed, and the sexual desire is inconsiderable. There is no remedy in these cases.

The action may be imperfect in several respects. The menses may be obstructed or sparing, or they may be too profuse or frequent. It is extremely rare for a woman to conceive who does not menstruate regularly. Hence where this is the case the first step is to regulate this periodical discharge.* For this purpose the advice of a physician will generally be required, for these irregularities depend upon such various causes and require such variety of treatment, that it would be inconsistent with the plan of this work to attempt to give instructions for remedying them. A state of exhaustion, or weakness of the uterine system, occasioned by too frequent intercourse, is a frequent cause of sterility. The sterility of prostitutes is attributed to this cause, but I doubt it being the only one. With females who are apparently healthy, the most frequent cause is a torpor, rather than weakness, of the genital organs.

For the removal of sterility from this cause, I shall give some instructions, and this I do the more readily because the requisite means are such as will also regulate the menses in many cases, where they do not appear so early in life, so freely or so frequently as they ought.

In the first place it will generally be necessary to do something towards invigorating the system by exercise in the open air, by nourishing food of easy digestion, by sufficient dress, particularly flannel, and especially by strict temperance in all things. With this view also, some scales which fall from the blacksmith's anvil, of some steel filings, may be put into old cider or wine (cider the best), and after standing a week or

* Chavasse, pp. 87-107, deals very fully with this point.—[Publishers' note.]

so, as much may be taken two or three times a day as can be borne without disturbing the stomach. All the while the bowels are to be kept rather open, by taking from one to three of *Pill rufi* every night on going to bed. These pills consist of four parts of aloes, two parts of myrrh, and one of saffron, by weight.

These measures having been regularly pursued until the system be brought into a vigorous state, medicines which are more particularly calculated to arouse the genital organs from a state of torpor may be commenced, and continued for months if necessary. The cheapest, most simple (and I am not prepared to say it is not the most effectual in many cases), is cayenne. All the virtues of this article are not generally known even to physicians. I know it does not have the effect upon the coats of the stomach that many have conjectured. It may be taken in the quantity of from one to two rising tea-spoonsful, or even more, every day, upon food or on any liquid vehicle. Another medicine of much efficacy is Dewees' Volatile Tincture of Guaiac. It is generally kept by apothecaries, and is prepared as follows :—

Take of Gum Guaiacum, in powder eight ounces ; carbonate of Potash, or of Soda, or (what will answer) Salaeratus, three drachms ; Allspice, in powder, two ounces ; any common spirits of good strength, two pounds, or what is about the same, two pints and a gill. Put all into a bottle, which may be shaken now and then, and the use of it may be commenced in a few days. To every gill of this, at least a large tea-spoonful of Spirits of Ammonia is to be added. A tea-spoonful is to be taken for a dose, three times a day, in a glass of milk, cider, or wine. It is usually given before eating; but if it should chance to offend the stomach when taken before breakfast, it may in this case be taken an hour after.

Dr. Dewees found this tincture, taken perhaps for months, the most effectual remedy for painful menstruation, which is an obstinate complaint. If there be frequent strong pulse, heat, thirst, florid countenance, &c., it is not to be taken until these symptoms be removed by low diet, a few doses of salts, and bleeding, if required.

A third medicine for arousing the genital organs is tincture of Spanish Flies. But I doubt its being equal, in sterility, to the above-mentioned medicines, though it may exceed them in

some cases, and may be tried if these fail. A drachm of them may be put to two gills of spirits. Dose, 25 drops, in water, three times a day, increasing each one by two or three drops, until some degrees of stranguary occurs, then omit until this pass off, as it will in a day or two. Should the stranguary be severe, drink freely of milk and water, slippery elm, or flax seed tea.

In many cases of sterility, where the general health is considerably in fault, and especially where the digestive organs are torpid, I should have much confidence in a Thomsonian course. It is calculated to arouse the capillary vessels throughout the whole system, and thus to open the secretions, to remove obstructions, and free the blood of those effete and phlegmy materials which nature requires to be thrown off. The views of the Thomsonians as to heat and cold, appear to me unphilosophical. But this has nothing to do with the efficiency of their measures.

In relation to sterility, I would here bring to mind, what has been before stated, that a woman is most likely to conceive immediately after a menstrual turn. And now, also, let me suggest the idea that nature's delicate beginnings may be frustrated by the same means that put her a-going. This idea is certainly important when the woman is known to have miscarried a number of times. Sterility is sometimes to be attributed to the male, though he apparently be in perfect health. It would be an interesting fact to ascertain if there be no seminal animalcules in these cases ; and whether medicines of any kind are available.

It has been ascertained that a male and female may be sterile in relation to each other, though neither of them be so with others.

The foregoing measures for sterility are also suitable in cases of impotency. This term, I believe, is generally confined to, and defined as, a want of desire or ability, or both, on the part of the male ; but I see no good reason why it should not comprehend the cases in which there is neither desire nor pleasure with the female. Such females, it is true, may be fruitful ; but so, on the other hand, the semen may not have lost its fecundating property. Impotency, at a young or middle age, and in some situations in life especially, is certainly a serious misfortune to say the least of it. The whole evil by no means consists in every case, in the loss of

a source of pleasure. All young people ought to be apprised of the causes of it—causes which in many instances greatly lessen one's ability of giving and receiving that pleasure which is the root of domestic happiness. I shall allude to one cause, that of premature, and especially solitary gratification, in another place. Intemperance in the use of spirits is another powerful cause. Even a moderate use of spirits, and also of tobacco, in any form, have some effect. It is a law of the animal economy, that no one part of the system can be stimulated or excited, without an expense of vitality, as it is termed. That part which is stimulated draws the energy from other parts. And hence it is, that close and deep study, as well as all the mental passions when excessive, impair the venereal appetite. All excesses, all diseases and modes of life, which impair the general health, impair this appetite, but some things more directly and powerfully than others.

As to the remedies for impotency, they are much the same as for sterility. It is of the first importance that the mind be relieved from all care and anxiety. The general health is to be improved by temperance, proper exercise in the open air, cheerful company, change of scenery, or some occupation to divert the mind without requiring much exercise of it; nourishing food of easy digestion; flannel worn next to the skin. The cold bath may be tried, and if it be followed by agreeable feelings, it will do good. The bowels may be gently stimulated by the pills before mentioned; and the preparation of iron also, already mentioned, should be taken.

To stimulate the genital organs more directly, cayenne, Dewees' tincture of guaiac, or tincture of flies may be taken. I have given directions for making and taking the tincture of flies, chiefly because it is esteemed one of the best remedies for impotency caused by or connected with nocturnal emissions, to which I have before alluded.

It is in cases where little or no pleasure, nor erection attend these emissions—cases brought on by debauchery, or in elderly persons, that I would recommend tincture of flies, and the other measures above mentioned. In some bad cases, enormous doses of this tincture are required, say two or three hundred drops. Yet the best rule for taking it is that already given, namely, begin with small doses, and gradually increase until some stranguary be felt, or some benefit be received. In

this affection, as well as in all cases of impaired virility, the means I have mentioned are to be pursued for a long time, unless relief be obtained. These have cured after having been taken for a year or more without the result. In all cases of impotency not evidently depending upon disease of some part besides the genital organs, I should have much confidence in blisters applied to the lower part of the spine.

Occasional nocturnal emissions, accompanied with erection, and pleasure, are by no means to be considered a disease; though they have given many a one much uneasiness. Even if they be frequent, and the system considerably debilitated, if not caused by debauch, and the person be young, marriage is the proper measure.

There have been several means proposed and practised for checking conception. I shall briefly notice them, though a knowledge of the best is what most concerns us. That of withdrawal immediately before emission is certainly effectual, if practised with sufficient care. But if (as I believe) Dr. Dewees' theory of conception be correct; and as Spallanzani's experiments show that only a trifle of semen even largely diluted with water, may impregnate by being injected into the vagina, it is clear that nothing short of entire withdrawal is to be depended upon. But the old notion that the semen must enter the uterus to cause conception, has led many to believe that a partial withdrawal is sufficient, and it is on this account that this error has proved mischievous, as all important errors generally do. It is said by those who speak from experience, that the practice of withdrawal has an effect upon the health similar to temperance in eating. As the subsequent exhaustion is probably mainly owing to the shock the nervous system sustains in the act of coition, this opinion may be correct. It is further said that this practice serves to keep alive those fine feelings with which married people first come together. Still I leave it for every one to decide for himself whether this check be so far satisfactory, as not to render some other very desirable.

As to the baudruche, which consists in a covering used by the male, made of very delicate skin, it is by no means calculated to come into general use. It has been used to secure from syphilitic affections.

Another check which the old idea of conception has led some to recommend with considerable confidence, consists in

introducing into the vagina, previous to connexion, a very delicate piece of sponge, moistened with water, to be immediately afterwards withdrawn by means of a very narrow ribbon attached to it.* But as our views would lead us to expect, this check has not proved a sure preventative. As there are many little ridges or folds in the vagina, we cannot suppose the withdrawal of the sponge would dislodge all the semen in every instance. If, however, it were well moistened with some liquid which acted chemically upon the semen, it would be pretty likely to destroy the fecundating property of what might remain. But if this check were ever so sure, it would, in my opinion, fall short of being equal, all things considered, to the one I am about to mention—one which not only dislodges the semen pretty effectually, but at the same time destroys the fecundating property of the whole of it.

It consists in syringing the vagina immediately after connection, with a solution of sulphate of zinc, of alum, pearl-ash, or any salt that acts chemically on the semen, and at the same time produces no unfavourable effect on the female.

In all probability, a vegetable astringent would answer—as an infusion of white oak bark, of red rose leaves, of nut-galls, and the like. A lump of either of the above-mentioned salts, of the size of a chesnut, may be dissolved in a pint of water, making the solution weaker or stronger, as it may be borne without producing any irritation of the parts to which it is applied. These solutions will not lose their virtues by age. A female syringe, which will be required in the use of the check, may be had at the shop of an apothecary for a shilling or less. If preferred, the semen may be dislodged, as far as it can be, by syringing with simple water, after which some of the solution is to be injected, to destroy the fecundating property of what may remain lodged between the ridges of the vagina, &c.

I know the use of this check requires the woman to leave her bed for a few moments, but this is its only objection; and it would be unreasonable to suppose that any check can ever be devised entirely free of objections. In its favour, it may be said, it costs nearly nothing; it is sure; it requires no sacrifice of pleasure; it is in the hands of the female; it is to be used after, instead of before connection, a weighty consideration in its favour, as a moment's reflection will convince any one;

* This was a check advocated by Carlile.—[Publishers' note.]

and last, but not least, it is conducive to cleanliness, and preserves the parts from relaxation and disease. The vagina may be very much contracted by a persevering use of astringent injections, and they are constantly used for this purpose in cases of *procidentia uteri*, or a sinking down of the womb—subject as women are to *fluor albus*, and other diseases of the genital organs, it is rather a matter of wonder that they are not more so, considering the prevailing practices. Those who have used this check (and some have used it, to my certain knowledge, with entire success for nine or ten years, and under such circumstances as leave no room to doubt its efficacy) affirm they would be at the trouble of using injections merely for the purposes of health and cleanliness.*

By actual experiment it has been rendered highly probable that pregnancy may, in many instances, be prevented by injections of simple water, applied with a tolerable degree of care. But simple water has failed, and its occasional failure is what we should expect, considering the anatomy of the parts, and the results of Spallanzani's experiments heretofore alluded to.

Thus much did I say respecting this check in the first edition of this work. That is what I call the chemical check. The idea of destroying the fecundating property of the semen was original, if it did not originate with me. My attention was drawn to the subject by the perusal of "Moral Physiology." Such was my confidence in the chemical idea, that I sat down and wrote this work in July, 1831. But the reflection that I did not know that this check would never fail, and that if it should I might do some one an injury in recommending it, caused the manuscript to lie on hand until the following December. Some time in November I fell in with an old acquaintance, who agreeably surprised me by stating that to his own personal knowledge this last check had been used as above stated. I have since conversed with a gentleman with whom I was acquainted, who stated that, being in Baltimore some few years ago, he was there informed of this check by those who have no doubt of its efficacy. From what has as yet fell under my own observation, I am not warranted in drawing any conclusion. I can only say I

* There is no doubt that many diseases of the female organs might be prevented by greater personal cleanliness, and by the use of the syringe.—[Publishers' note.]

have not known it to fail. Such are my views on the whole subject, that it would require many instances of its reputed failure to satisfy me that such failures were not owing to an insufficient use of it. I even believe that quite cold water alone, if thoroughly used, would be sufficient. In Spallanzani's experiments warm water was unquestionably used. As the seminal animalculæ are essential to impregnation, all we have to do is to change the condition of, or, if you will, to kill them; and, as they are so exceedingly small and delicate, this is doubtless easily done, and hence cold water may be sufficient.

What has now been advanced in this work will enable the reader to judge for himself or herself of the efficacy of the chemical or syringe check, and time will probably determine whether I am correct in this matter. I do know that those married females who have much desire to escape will not stand for the little trouble of using this check, especially when they consider that on the score of cleanliness and health alone, it is worth all this trouble.

A great part of the time no check is necessary, and women of experience and observation with the information conveyed by this work will be able to judge pretty correctly when it is and when it is not. They may rest assured that none of the salts mentioned will have any deleterious effect. The sulphate of zinc is commonly known by the name of white vitriol. This, as well as alum, have been extensively used for leucorrhœa. Acetate of lead would doubtless be effectual—indeed, it has proved to be so; but I do not recommend it, because I conceive it possible that a long-continued use of it might impair the instinct.

I hope that no failures will be charged to inefficacy of this check which ought to be attributed to negligence or insufficient use of it. I will therefore recommend at least two applications of the syringe, the sooner the surer, yet it is my opinion that five minutes' delay would not prove mischievous —perhaps not ten.

CHAPTER IV.

Remarks on the Reproductive Instinct.

I SCARCELY need observe that by this instinct is meant the desire for sexual intercourse. Blumenbach speaks of this instinct as "superior to all others in universality and violence." Perhaps hunger is an exception. But surely no instinct commands a greater proportion of our thoughts, or has a greater influence upon our happiness for better or for worse. "Controlled by reason and chastened by good feeling, it gives to social intercourse much of its charm and zest, but directed by selfishness or governed by force it is prolific of misery and degradation. In itself, it appears to be the most social and least selfish of all instincts. It fits us to give even while receiving pleasure, and among cultivated beings the former power is even more highly valued than the latter. Not one of our instincts perhaps affords larger scope for the exercise of disinterestedness or fitter play for the best moral feelings of our race. Not one gives birth to relations more gentle, more humanising and endearing, not one lies more immediately at the root of the kindliest charities and most generous impulses that honour and bless human nature. It is a much more noble, because less purely selfish, instinct than hunger or thirst. It is an instinct that entwines itself around the warmest feelings and best affections of the heart."—*Moral Physiology.* But too frequently its strength, together with a want of moral culture, is such that it is not "controlled by reason;" and consequently, from time immemorial, it has been gratified, either in a mischievous manner, or to such an intemperate degree, or under such improper circumstances, as to give rise to an incalculable amount of human misery. For this reason it has, by some, been regarded as a low, degrading, and "carnal" passion, with which a holy life must be ever at war. But, in the instinct itself, the philosopher sees nothing deserving of degrading epithets. He sees not that nature should war against herself. He believes that in savage life it *is*, and in wisely organized societies of duly enlightened and civilized beings it *would be*, a source of tenfold more happiness than misery.

A part of the evil consequences to which this instinct is daily giving rise under the present state of things, it belongs

more particularly to the moralist to point out; whilst of others it falls within the province of the physician to treat. But let me first remark, that physicians have hitherto fallen far short of giving those instructions concerning this instinct which its importance demands. In books, pamphlets, journals, &c., they have laid much before the public respecting eating, drinking, bathing, lacing, air, exercise, &c.; but have passed by the still more important subject now before us, giving only here and there some faint allusion to it. This, it is true, the customs, not to say pruderies, of the age, have compelled them to do, in publications designed for the public eye, yet, in some small work, indicated by its title to be for private perusal, they might, with the utmost propriety, have embodied much highly useful instruction in relation to this instinct.*

This instinct is liable to be gratified at improper times, to an intemperate degree, and in a mischievous manner.

True philosophy dictates that this and all other appetites be so gratified as will most conduce to human happiness—not merely the happiness attending the gratification of one of the senses, but all the senses—not merely sensual happiness, but intellectual—not merely the happiness of the individual, but of the human family.

First.—Of the times at which this instinct ought not to be gratified. With females it ought not to be gratified until they are seventeen or eighteen years of age, and with males not until they are a year or two older. The reason is, if they refrain until these ages, the passion will hold out the longer, and they will be able to derive much more pleasure from it in after life, than if earlier gratified, especially to any great extent. A due regard to health also enjoins with most persons some restraint on this instinct—indeed, at all times, but especially for a few years after the above-mentioned ages. It ought not to be rashly gratified at first. Begin temperately, and as the system becomes more mature, and more habituated to the effects naturally produced by the gratification of this instinct, it will bear more without injury. Many young married people, ignorant of the consequences, have debilitated the whole system—the genital system in particular; have impaired their mental energies; have induced consumptive and other diseases; have rendered themselves irritable, unsocial, melancholy, and finally, much impaired, perhaps de-

* Since this was written many such popular medical works have been issued and publicly sold.—[Publishers' note.]

stroyed their affection for each other, by an undue gratification of the reproductive instinct. In almost all diseases, if gratified at all, it should be very temperately. It ought not to be gratified during menstruation, as it might prove productive, to the man, of symptoms similar to those of syphilis,* but more probably to the woman of a weakening disease called *fluor albus*. In case of pregnancy a temperate gratification for the first two or three months may be of no injury to the woman or the forthcoming offspring. But it ought to be known that the growth of the fœtus in utero may be impaired, and the seeds of future bodily infirmity and mental imbecility of the offspring may be sown, by much indulgence during utero-gestation or pregnancy, especially when the woman experiences much pleasure in such indulgences.

Having already glanced at some of the bad effects of an undue gratification of this instinct, I have but little more to offer under the head of Intemperate Degree. It will be borne in mind that temperance in this thing is not to be decided by numbers, but that it depends on circumstances ; and what would be temperance in one, may be intemperance in another. And with respect to an individual, too, what he might enjoy with impunity, were he a labouring man, or a man whose business requires but little mental exercise, would, were he a student, unfit him for the successful prosecution of his studies. Intemperance in the gratification of this instinct has a tendency to lead to intemperance in the use of ardent spirits. The langour, depression of spirits, in some instances faintness and want of appetite, induced by intemperate gratification, call loudly for some stimulus, and give a relish to spirits. Thus the individual is led to drink. This inflames the blood, the passions, and leads to further indulgence. This again calls for more spirits ; and thus two vicious habits are commenced, which mutually increase each other. Strange as it may appear to those unacquainted with the animal economy, an intemperate indulgence sometimes gives rise to the same disease—so far as the name makes it so—that is frequently cured by a temperate indulgence ; viz., nocturnal emissions.

Every young married woman ought to know that the male

* Gonorrhœa, or a purulent discharge, and not syphilis, is evidently what is here meant by Dr. Knowlton. The two affections were at one time confounded together, and were often thought to be different forms of the same disease, but they are now known to be quite distinct. Syphilis is the product of a peculiar blood-poison, and never arises except by contagion from another person suffering from a similar disease.—G. R.

system is exhausted in a far greater degree than the female by gratification. It seems, indeed, to have but little effect, comparatively, upon some females. But with respect to the male, it has been estimated by Tissot that the loss of one ounce of semen is equal in its effects upon the system to the loss of 40 ounces of blood. As it respects the immediate effects, this estimation, generally speaking may not be too great. But a man living on a full meat diet might, doubtless, part with fifty ounces of semen in the course of a year, with far less detriment to the system than with 2000 ounces of blood. It is a fact, that mode of living independent of occupation makes a great difference with respect to what the system will bear. A full meat diet, turtles, oysters, eggs, spirits, wine, &c., certainly promote the secretion of semen, and enable the system to bear its emission. But a cool vegetable and milk diet calms all the fiercer passions, the venereal especially. Most men adopting such a diet as this will suffer no inconvenience in extending the intervals of their gratification to three or four weeks; on the contrary, they will enjoy clear intellect, and a fine flow of spirits. This is the diet for men of literary pursuits, especially the unmarried.

As to the mischievous manner, it consists in the unnatural habit of onanism, or solitary gratification; it is an anti-social and demoralising habit, which, while it proves no quietus to the mind, impairs the bodily powers, as well as mental, and not unfrequently leads to insanity.

While the gratification of the reproductive instinct in such manner as I have mentioned leads to bad consequences, a temperate and natural gratification, under proper circumstances, is attended with good—besides the mere attendant pleasure, which alone is enough to recommend such gratification. I admit that human beings might be so constituted that if they had no reproductive instinct to gratify, they might enjoy good health; but being constituted as they are, this instinct cannot be mortified with impunity. It is a fact universally admitted, that unmarried females do not enjoy so much good health and attain to so great an age as the married; notwithstanding that the latter are subject to the diseases and pains incident to child-bearing. A temperate gratification promotes the secretions, and the appetite for food; calms the restless passions; induces pleasant sleep; awakens social feeling, and adds a zest to life which makes one conscious that life is worth preserving.

APPENDIX.

[I here connect with this work, by way of Appendix, the following extract from an article which appeared in the "Boston Investigator," a paper which, *mirabile dictu*, is so "crazy" as to be open to the investigation of all subjects which mightily concern mankind.]

THE only seeming objection of much weight that can be brought against diffusing a knowledge of checks is, that it will serve to increase illegal connections. Now this is exactly the contrary effect of that which those who have diffused such knowledge most confidently believe will arise from it. To diminish such connections is indeed one of the grand objects of these publications—an object which laws and prisons cannot, or at least do not, accomplish. Why is there so much prostitution in the land? The true answer to the question is not, and never will be—Because the people have become acquainted with certain facts in physiology. It is because there are so many unmarried men and women—men of dissipation and profligacy, owing to their not having married in their younger days and settled down in life. But why are there so many unmarried people in the country? Not because young hearts, when they arrive at the age of maturity, do not desire to marry, but because prudential considerations interfere. The young man thinks I cannot marry yet, I cannot support a family, I must make money first, and think of a matrimonial settlement afterwards. And so it is that, through fear of having a family, before they have made a little head-way in the world, and of being thereby compelled to "tug at the oar of incessant labour throughout their lives," thousands of young men do not marry, but go abroad into the world, and form vicious acquaintances and practices. The truth, then, is this, there is so much of illegal connection in the land, because the people had not, twenty years ago, that very information which, it would seem, to some, doubtless through want of due reflection, are apprehensive will increase this evil. I might quote pages to the point from "Every Woman's Book;" but I fear my communication would be too lengthy. I content myself with a few lines. "But when it has become the custom here as elsewhere to limit the number of children, so that none need have more than they wish, no man will fear to take a wife, all will marry while young; debauchery will diminish; while good morals, and religious duties will be promoted."

It has been asked, if a general knowledge of checks would not diminish the general increase of population? I think that such would not be the result in this country until such result would be

desirable. In my opinion, the effect would be a good many more families (and on the whole as many births), but not so many overgrown and poverty-stricken ones.

It has been said, it is best to let nature take her course. Now in the broadest sense of the word nature, I say so too. In this sense, there is nothing unnatural in the universe. But if we limit the sense of the word nature so as not to include what we mean by art, then is civilized life one continued warfare against nature. It is by art that we subdue the forest, by art we contend against the elements; by art we combat the natural tendency of disease, &c.

As to the outrageous slander which here and there one has been heard to utter against the fair sex, in saying that fear of conception is the foundation of their chastity, it must be the sentiment of a "carnal heart," which has been peculiarly unfortunate in its acquaintances. 'To the pure all things are pure.' Chastity, as well as its opposite, is in a great degree constitutional; and ought in a like degree to be regarded as a physical property, if I may so say, rather than a moral quality. Where the constitution is favourable, a very indifferent degree of moral training is sufficient to secure the virgin without the influence of the above-mentioned fear; but where it is the reverse, you may coop up the individual in the narrow dark cage of ignorance and fear, as you will, but still you must watch. An eminent moralist has said, "That chastity which will not bear the light [of Physiology] is scarcely worth preserving." But, verily, I believe there is very little such in the market. What there be is naturally short-lived, and, after its demise, the unhappily constituted individual stands in great need of this light to save her from ignominy. What might it not have prevented in the Fall River affair? And if one of two things must happen, either the destruction of fecundity or the destruction of life, which of the two is the greater evil? In these cases, alone, this light is calculated to do sufficient good to counterbalance all the evil that would arise from it; so that we should have its important advantages to the married, in a political, a domestic, and a medical point of view, as so much clear gain. This of course is my opinion; but since I have probably reflected more upon the subject than all the persons concerned in my imprisonment put together, until it can be shown that I have not as clear a head and as pure a heart as any of them, I think it entitled to some weight.

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